Iterative and recursive estimators for hidden Markov errors-in-variables models

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Abstract:
In this paper we propose maximum-likelihood (ML) estimation of errors in variables models with finite-state Markovian disturbances. Such models have applications in econometrics, speech processing, communication systems, and neurobiological signal processing. We derive the maximum likelihood (ML) model estimates using the expectation maximization (EM) algorithm. Then two recursive or “on-line” estimation schemes are derived for estimating such models. The first on-line algorithm is based on the EM algorithm and uses stochastic approximations to maximize the Kullback-Leibler (KL) information measure. The second on-line algorithm we propose is a gradient-based scheme and uses stochastic approximations to maximize the log likelihood

Index Terms:
error statistics hidden Markov models iterative methods maximum likelihood estimation recursive estimation signal processing Kullback-Leibler information measure applications communication systems econometrics expectation maximization algorithm finite-state Markovian disturbances gradient-based scheme hidden Markov errors-in-variables models iterative estimators log likelihood maximum-likelihood estimation neurobiological signal processing on-line algorithm on-line estimation schemes recursive estimators speech processing stochastic approximations

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